

APPENDIX (Glossary)

State related

Design state - represented by the values in the state holding elements in a design.

5 State holding elements - it can be a wire, a register, or a latch in a design.

Initial state - the design state at the beginning of the operation of a design.

Current state - the design state under consideration.

Successor state - a state generated from the current state in one simulation step.

10 Reachable state - a state such that there exists a sequence of stimuli so that this state can be generated by simulating the design using the stimuli.

State Space - the set of all possible design state in the design. It includes all possible combination of values in the state holding elements. Some of the states in the state space are reachable, and some are not.

Stimulus related

Stimuli/Inputs - stimulus and inputs are different. Inputs are usually wires that connect to the design; whereas stimulus refers to the values of these inputs as driven by the environment of the design.

15 Predetermined sequence of stimuli - they are usually specified manually by the designer, or generated randomly from a template specified manually by the designer.

Stimulus Specification - summarizes what kinds of stimuli are possible and under what scenarios each of the possible stimuli may occur.

25 Interesting Stimulus - it refers to a stimulus that is more likely to simulate a new aspect of a design.

Region related

Validation regions - each region represents a set of possible design states of a design. This is a new concept used in the present invention. It is similar to an abstract state used in formal verification, but there is not restriction as to how the design states are assigned to a region. An abstract state in formal verification must represents a set of possible design states with a property that allows simultaneous manipulation.

Dividing the state space - this represents the process of dividing the state space into a set of validation regions, so that every state in the state space belongs to one and only one region.

Representative state holding elements - in the current implementation of the present invention, a subset of state holding elements in the design is selected to specify a way to divide the state space into a set of validation regions. In this approach, states with the same combination of values in the representative state holding elements belong to the same region.

Simulation history of a validation region - this summarizes what has happened during stimulation, at times when the current state of the design belongs to this validation region. In the current implementation, the history maintains the number of times in which a particular stimulus was used for performing a simulation step when the current state belong to this validation region.

Implementation related

Hash table - a data structure used in programming to provide quick access to a large set of data elements. Each data element is associated with a key. A hash table usually translates a key into a location; and one or more data elements are stored at each location.